

WHAT IS CLAIMED IS:

- 1 1. A cushioning element operable to contact a secondary object
- 2 for cushioning, said cushioning element comprising:
 - 3 a bladder body having inner and outer walls sealingly closed at
 - 4 opposite ends of the bladder body, or one end selectively, and defining at least
 - 5 one chamber between the inner and outer walls,
 - 6 particulate material comprising micro-spheres in air filling each of the
 - 7 chambers,
 - 8 the outer wall being flexible and capable of being deformed into a
 - 9 deformed shape as particulate material in the chambers is moved by a pressing
 - 10 operation which is applied to the outer wall, and
 - 11 the inner wall being operable to receive a mounting member for
 - 12 mounting the bladder body to an article;
 - 13 wherein the particulate material in the chambers that is moved by the
 - 14 pressing operation remains in the same position upon completion of the
 - 15 pressing operation for eliminating back-pressure exerted by the particulate
 - 16 material against the flexible outer wall, thereby maintaining the flexible outer
 - 17 wall in substantially the deformed shape which the flexible outer wall
 - 18 assumed during the pressing operation, and
 - 19 the particulate material in air and the sealingly closed opposite ends of
 - 20 the bladder body cooperating to resist leakage of the chambers and

21 configuring the particulate material within a specific space allowing the
22 particulate material to pack and hold the deformed shape assumed during the
23 pressing operation.

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1 2. The cushioning element as claimed in claim 1, wherein the at
2 least one chamber comprises a single molded part or a multi-chambered
3 enclosure, and

4 wherein the chambers are disposed in a linear, sequential, or random
5 manner.

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1 3. The cushioning element as claimed in claim 1, wherein the
2 secondary object is a part of a human body.

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1 4. The cushioning element as claimed in claim 1, wherein said
2 mounting member comprises a mounting surface integrated with at least a
3 portion of said inner wall, said mounting surface being contoured to at least
4 partially correspond to a shape of the secondary object.

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1 5. The cushioning element as claimed in claim 1, wherein said
2 mounting member is provided on said inner wall.

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1 6. The cushioning element as claimed in claim 1, wherein an
2 opening is provided between said outer wall and the inner wall, said opening
3 for allowing particulate matter to be filled into said at least one chamber; and
4 wherein a closure element is provided in said opening to close said at
5 least one chamber.

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1 7. The cushioning element as claimed in claim 6, wherein said
2 closure element is coupled removably to said inner wall to permit selective
3 access to said at least one chamber.

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1 8. The cushioning element as claimed in claim 6, wherein said
2 closure element is sealed to said inner wall to seal said opening.

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1 9. The cushioning element as claimed in claim 1, wherein said
2 outer wall is made of a material selected from a group consisting of synthetic
3 and natural rubber, thermoplastic elastomers, thermoplastic resins, polyester,
4 elastomer and plastic reinforced textiles, polyurethane, nylon, textiles, and
5 leather.

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1 10. The cushioning element as claimed in claim 1, wherein said
2 inner wall is rigid; and

3 wherein said inner wall is integral with a portion of the article on
4 which said cushioning element is mounted and forms a structural portion of
5 the article.

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1 11. The cushioning element as claimed in claim 1, wherein said
2 mounting member has a mounting surface operable to be coupled to the
3 article.

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1 12. The cushioning element as claimed in claim 1, wherein said
2 particulate matter substantially fills the entire filling chamber.

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1 13. The cushioning element as claimed in claim 1, wherein said
2 particulate matter comprises individual particles sized and dimensioned to be
3 capable of freely flowing within said at least one chamber to allow said
4 cushioning element to deform.

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1 14. The cushioning element as claimed in claim 1, wherein said
2 particulate matter is made of a material selected from the group consisting of
3 thermoplastics, thermoset plastics, synthetic and natural rubber, quartz,

4 mineral, ceramics, silicon, glass, metals, phenol, wood, silica, sand, salt,
5 seeds, grain, organic materials, microbeads, microspheres, granules,
6 crystallized and powder particles.

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1 15. The cushioning element as claimed in claim 1, wherein the
2 inner wall is rigid.

1 16. The cushioning element as claimed in claim 1, wherein vanes
2 or posts extend from the inner wall to the outer wall.

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1 17. The cushioning element as claimed in claim 1, wherein spoke-
2 shaped walls or posts extend from the inner wall to the outer wall.

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1 18. The cushioning element as claimed in claim 1, wherein a first
2 end of the cushioning element is molded closed and a second end of the
3 cushioning element is sealingly closed.

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1 19. A cushioning element operable to contact a secondary object
2 for cushioning, said cushioning element comprising:

3 a bladder body having inner and outer walls sealingly closed at
4 opposite ends of the bladder body, or one end selectively, and defining at least
5 one chamber between the inner and outer walls,
6 particulate material comprising micro-spheres in air filling each of the
7 chambers,
8 the outer wall being flexible and capable of being deformed into a
9 deformed shape as particulate material in the chambers is moved by a
10 deforming force applied to the outer wall by the secondary object, the
11 deformed shape corresponding to a shape of the secondary object, and
12 the inner wall being operable to receive a mounting member for
13 mounting the bladder body to an article;
14 wherein the particulate material in the chambers that is moved by the
15 deforming force remains in the same position upon completion of the
16 deforming force for eliminating back-pressure exerted by the particulate
17 material against the flexible outer wall, thereby maintaining the flexible outer
18 wall in substantially the deformed shape which corresponds to the shape of the
19 secondary object which the flexible outer wall assumed during the application
20 of the deforming force, and
21 the particulate material in air and the sealingly closed opposite ends of
22 the bladder body cooperating to resist leakage of the chambers and
23 configuring the particulate material within a specific space allowing the

24 particulate material to pack and hold the deformed shape assumed during the
25 application of the deforming force.

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